EVALUATION OF DIFFERENT FEEDING FREQUENCIES IN SERIOLA DUMERILI JUVENILES: EFFECTS ON HEMATOLOGICAL AND BIOCHEMICAL PARAMETERS

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Introduction

Seriola dumerili is a very promising species for the aquaculture due its excellent flesh quality and high growth rate in culture conditions. As the applied methodologies for grow out are adaptations from other species, it is essential to develop appropriate feeding strategies for this species in order to improve growth, fish health and welfare.Measuring blood biochemical components is an important tool as health status index and nutritionalconditional of fish. In this study, different feeding frequencies have been tested in greater amberjack (*S. dumerili*) juveniles, evaluating its influence on hematological and biochemical parameters.

Materials and methods

The study was conducted with 180 *S. dumerili* juveniles born in captivity. Fish (average weight 262.1 ± 55.5g) were tagged with a passive integrated transponder (PIT) and randomly divided into 12 homogeneous groups of 15 fish each. The groups were maintained in fiberglass tanks with a constant water exchange and aeration, under natural conditions of photoperiod, water salinity (37.5‰) and temperature (18.8±0.4ºC). Fish were fed a commercial pellet for turbot (Skretting Ltd, Norway). The food ration was adjusted to 2.5% of body weight per day. Each three groups were fed at a feeding frequency of either 1, 2, 3 or 7 meals per day, resulting in 4 treatments by triplicate.

On days 0 (start of the trial) and 60 (end of the trial), all fish in each tank were anesthetized, identified individually and measured for weight and length. Five fish per tank were then selected randomly for blood collection. Blood was collected from the caudal vessels using heparinized needles. Plasma samples were separated after centrifugation at 1400 rev/min g for 20 minutes and stored at -80°C until analysis.

Total erythrocytes and leucocytes was determined by counting in 1/100 dilutions of blood in Natt and Herricks solution, using a Neubauer haemocytometer. Hematocrit count was carried out by capillary diffusion and centrifugation.Plasma levels of triglycerides, cholesterol, protein and glucose were measured by enzymatic standard spectrophotometric assays (Biosystems).

Results and discussion

Biometrical, hematological and biochemical parameters registered at the beginning and at the end of the trial for the four different feeding frequencies assayed are shown in Table I. At the beginning of the trial, the 12 fish groups were homogeneous in weight and blood biochemical indicators. Both hematological and biochemical parameters obtained in the present experiment are considered to be within the normal range for juvenile amberjack, compared to those of the previous findings (Kawanago *et al*., 2014; Dawood *et al*., 2015). At the end of the growth period,significant differences were not found between groups fed with different frequencies. All blood parameters studied remained constant in all groups of fish and only protein, cholesterol and hematocrit were slightly lower in the 7-meals fish groups although without significant differences.

Table I. Weight (g), erythrocytes ($x10^5$), leucocytes ($x10^3$), hematocrit (%), triglycerides (mg/dl), cholesterol (mg/dl), protein (g/l), glucose (mg/dl). Data collected at the beginning (initial day 0) and at the end (final day 60) of the assay.

Initial data	**1 meal/day**	**2 meals/day**	**3 meals/day**	**7 meals/day**
Weight	270.1 ± 53.9	253.4 ± 45.3	262.0 ± 54.9	264.7 ± 67.4
Erythrocytes	18.47 ± 5.36	15.99 ± 3.65	16.43 ± 3.61	16.66 ± 5.34
Leucocytes	21.53 ± 5.69	17.11 ± 0.62	21.47 ± 9.92	19.20 ± 3.89
Hematocrit	39.13 ± 2.65	24.00 ± 12.26	31.82 ± 4.79	31.15 ± 16.06
Triglycerides	112.61 ± 51.84	108.90 ± 84.60	133.86 ± 61.40	125.78 ± 14.09
Cholesterol	204.56 ± 20.54	182.25 ± 28.56	222.05 ± 77.14	176.37 ± 73.20
Protein	25.03 ± 4.02	31.30 ± 0.78	36.57 ± 16.70	34.06 ± 6.05
Glucose	43.23 ± 1.78	83.42 ± 17.05	90.89 ± 2.38	55.41 ± 15.18
Final data	**1 meal/day**	**2 meals/day**	**3 meals/day**	**7 meals/day**
Weight	322.0 ± 72.2	310.6 ± 50.1	306.5 ± 59.9	311.3 ± 79.1
Erythrocytes	17.34 ± 3.24	15.25 ± 4.58	21.08 ± 1.86	15.73 ± 1.82
Leucocytes	70.27 ± 49.98	81.48 ± 52.90	115.5 ± 84.55	83.06 ± 65.94
Hematocrit	35.00 ± 0.66	36.18 ± 9.79	35.27 ± 2.91	28.23 ± 7.22
Triglycerides	127.70 ± 37.04	154.89 ± 41.53	95.40 ± 27.65	109.35 ± 75.45
Cholesterol	342.04 ± 79.35	289.77 ± 81.41	305.80 ± 42.55	207.75 ± 82.84
Protein	34.95 ± 11.66	40.74 ± 6.19	26.86 ± 7.21	23.49 ± 5.00
Glucose	58.50 ± 26.61	37.84 ± 14.18	44.84 ± 8.08	42.75 ± 6.88

Values are means ± SD (n=3).

During the trial, fish were infected by the monogenean *Zeuxapta seriolae,* which caused mortality of 27% between the fourth and the fifth week.No significant differences were found in the mortality percentage between fish fed with different feeding frequencies. However, a significant increase of leucocytes ($p<0.05$) was observed in all groups at the end of the trial possibly because of infestation. Also an increase in cholesterol contents ($p<0.05$) was detected on 60 day in all groups.

Conclusions

The absence of changes among the hematological and biochemical parameters suggest that *Seriola dumerili* juveniles were able to adapt to the different feeding frequencies under the particular culture conditions and during the experimental period described in this study.

References

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